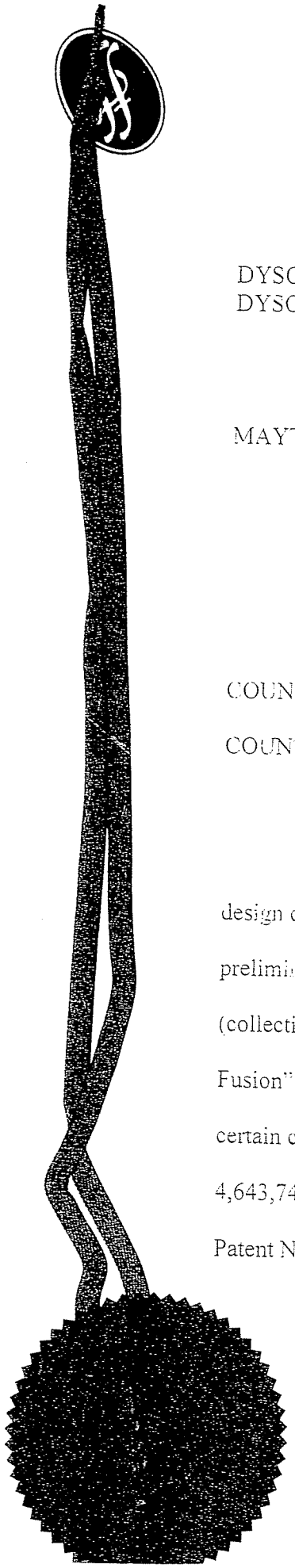
JONES AFFIDAVIT



IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF DELAWARE

DYSON TECHNOLOGY LIMITED and DYSON, INC., Plaintiffs, v. MAYTAG CORPORATION, Defendant.	)	C.A. No. 05-434 (GMS)

AFFIDAVIT OF GARETH EVAN LYN JONES

COUNTRY OF ENGLAND)
ss.
COUNTY OF WILTSHIRE)

GARETH EVAN LYN JONES, being duly sworn, deposes and says:

1. I am the director and owner of Fresh Design Limited, a product design consulting firm, and submit this affidavit in support of the motion for a preliminary injunction brought by Dyson, Inc. and Dyson Technology Limited (collectively, "Dyson"). As explained further below, it is my opinion that the "Hoover Fusion" vacuum cleaner sold by defendant Maytag Corporation ("Maytag") infringes certain claims of U.S. Patent No. 4,826,515 (the "'515 Patent"), U.S. Patent No. 4,643,748 (the "'748 Patent"), U.S. Patent No. 4,853,008 (the "'008 Patent"), and U.S. Patent No. 5,858,038 (the "'038 Patent") (collectively, the "Patents in Suit").

2. I am being compensated for my expert services at a rate of £1,000 per day of work.

Expert Qualifications

3. I have a mechanical engineering degree from Loughborough University in Leicestershire, England, which I obtained in 1988. I also have a Masters in Industrial Design Engineering degree from the Royal College of Art, which I received in 1991.

4. Since 1988, excepting the period from about September 1989 to about July 1991 when I was obtaining my masters degree, I have worked as a product design and development engineer in the United Kingdom, both as an employee and as an independent consultant. Among the products I have designed and developed are vacuum cleaners.

5. After graduating from Loughborough University, I worked full-time for about one year for Rolls-Royce Motor Cars Limited as a design and development engineer for its new product development division. Thereafter, from about March to August 1989 and from October 1991 to September 1992, I worked for James Dyson and his company, then known as Prototypes Limited and subsequently known as Dyson Research Limited, assisting in the design, development and production of vacuum cleaners using cyclonic technology. In October 1992, I left Prototypes Limited to start my own business and, from approximately October 1992 to the Spring of 1996, I was self-employed as a design consultant working on a variety of design projects unconnected with Mr. Dyson or his companies. Between the Spring of 1996 and August 1999, I worked with Mr. Dyson on a contract basis assisting his company in designing,

developing and/or producing various new products, including new model cyclonic vacuum cleaners known as the Dyson DC03 and Dyson DC04 and certain laundry products. During this period of time, I set up my own design consultancy business known as Fresh Design Limited. In around September 1999, I became an employee of Dyson Research Limited, taking up the position of Laundry Director and heading up the company's laundry products group. Although my main focus at this new position was on Dyson laundry products, I was still involved in preparing for and participating in meetings at which new technologies, including new cyclonic technologies for use in vacuum cleaners, were discussed. I held the Laundry Director position until February 2004, when I again decided to return to my own design consulting business. I have since that time acted as a design consultant for various companies unrelated to Mr. Dyson through my business, Fresh Design Limited. I am not an employee of Dyson and have no expectation of ever again becoming one.

6. I am not an inventor of any of the Patents in Suit and I did not work on any of the inventions at issue in this lawsuit when I was employed by companies owned by James Dyson. Having spent several years designing and developing Dyson vacuum cleaners employing cyclonic technology, as well as working with others involved in that process, however, I am an expert in that field and in how such technology is applied to vacuum cleaners.

Scope of Expert Analysis

7. I first learned about the Hoover Fusion vacuum cleaner when I was contacted by Gill Smith, Dyson's Director of Intellectual Property, in June 2005 and asked whether I would consider providing expert services to Dyson in connection with a

patent infringement suit in the United States against Maytag. I subsequently flew to New York to meet with Dyson's lawyers at Sullivan & Cromwell LLP ("S&C") on 5 and 6 July, 2005. At the beginning of this meeting, I was provided with an unopened box containing a recently-purchased Hoover Fusion vacuum cleaner and the Affidavit of Rachel Ryckman, a paralegal employed by S&C, dated 30 June, 2005. Among other things, Ms. Ryckman's affidavit stated that (a) she had purchased two Hoover Fusion vacuum cleaners at a Wal-Mart located at 1601 West Edgar Road, Linden, New Jersey, on 27 June, 2005; (b) the vacuum cleaners remained in her custody until she returned to S&C's offices; (c) she had placed her initials on the top of each of the two boxes containing the Hoover Fusion vacuum cleaners that she had purchased; and (d) she had stored the boxes along with other documents and materials relating to this lawsuit in a room at S&C. I was told at the meeting that the unopened Hoover Fusion that I was provided with was one of the two Hoover Fusion vacuum cleaners purchased by Ms. Ryckman on June 27. I also noted that the unopened box containing the Hoover Fusion had the initials "RR" on it. During my time at S&C, I (a) opened the box containing the new Hoover Fusion vacuum cleaner; (b) examined the Hoover Fusion vacuum cleaner in it; and (c) compared that vacuum cleaner with claims in the Patents in Suit. I should mention here that I had been provided with copies of these four patents on or about 23 June, 2005, and had begun studying the specifications, drawings and claims of the Patents in Suit before my meeting at S&C. Before July 5, I had never seen a Hoover Fusion vacuum cleaner and had formed no views whatsoever about the technology used in it.

Examination Process

8. During my time in New York on July 5 and 6, I carefully compared the technology described in the claims of the Patents in Suit to that used in the Hoover Fusion vacuum cleaner. As necessary, I (a) ran the vacuum cleaner to observe it in operation, (b) removed and replaced parts to observe their functions, locations, shapes and dimensions, and (c) took measurements using a Mitutoyo Digimatic Caliper. I also reviewed the Owner's Manual that came with the Hoover Fusion vacuum cleaner that I opened. A copy of that Owner's Manual is attached as Exhibit 1.

9. Subsequent to this meeting, S&C sent to me by overnight courier another unopened box containing a new Hoover Fusion vacuum cleaner. The unopened box that was sent to me was accompanied by the same 30 June, 2005 Affidavit of Rachel Ryckman discussed in paragraph 7 and it had what appeared to be Ms. Ryckman's initials on it. I am informed and believe that this was the second Hoover Fusion that Ms. Ryckman had purchased on 27 June, 2005. S&C also sent an unopened box containing a new Hoover Fusion directly to Dyson Limited's facilities in Wiltshire, England. That box was accompanied by a second Affidavit of Rachel Ryckman, dated 6 July, 2005. In this affidavit, Ms. Ryckman stated that (a) she had purchased three additional Hoover Fusion vacuum cleaners at a Wal-Mart located at 2465 Hempstead Turnpike, East Meadow, New York, on 6 July, 2005; (b) the three vacuum cleaners remained in her custody until she returned to S&C's offices; (c) upon her return, she had placed her initials and the number 3 (i.e., "RR3") on the first box, her initials and the number 4 (i.e., "RR4") on the second box, and her initials and the number 5 (i.e., "RR5") on the third box; and (d) she had stored the boxes in a room at S&C. The unopened box sent to

Dyson Limited had the initials "RR3" on it. I used the vacuum cleaners sent to me and Dyson Limited to further study and test the Hoover Fusion. S&C also sent to me a copy of the prosecution histories for the Patents in Suit, which I have reviewed.

Summary of Conclusions

10. As a result of my examination, I have concluded that the Hoover Fusion is a cyclonic vacuum cleaner that employs certain technologies described in and protected by at least one claim of each of the four Patents in Suit. Specifically, it is my opinion that the Hoover Fusion infringes claim no. 14 of the '515 Patent; claim nos. 15; 16 and 17 of the '748 Patent; claim nos. 1, 2, 3, 7, 11, 23, 24 and 25 of the '008 Patent; and claim nos. 1, 2, 3, 7, 13 and 14 of the '038 Patent. I describe below the reasons for these conclusions. I have interpreted the elements of each of these claims as one of ordinary skill in the art of cyclonic vacuum cleaner technology would interpret them in light of the patent specifications. All of the photographs of the Hoover Fusion or its parts referenced below and attached as exhibits to this affidavit were taken by me using a digital camera that I own. With the exception of certain diagrams that I reference below from the Hoover Fusion's Owner's Manual, all of the diagrams referenced below and attached as exhibits to this affidavit were created by me.

Overview of the Technology and Patents at Issue

11. The cyclonic vacuum cleaner technology that James Dyson invented (see, e.g., U.S. Patent No. 4,593,429) consists of an outer cyclone formed by a cylinder-shaped container and an inner cyclone formed by a cone-shaped device. Air flows tangentially into the outer container at speed, creating centrifugal force. This centrifugal force separates larger particles from the air, which are deposited at the bottom

of this container. The air from the outer container then travels to and into the top of the cone-shaped cyclone, which further increases the speed of the air. This creates even greater centrifugal force to capture smaller particles. These smaller particles are trapped in a separate dirt collection chamber situated at the bottom of the cone-shaped cyclone. When the air flow reaches the bottom of the container below the cone-shaped cyclone, it travels back up through the center of the cyclone, where there is an air outlet leading to an exhaust opening on the vacuum cleaner. A diagram illustrating the basics of this technology is attached as Exhibit 2.

12. The Patents in Suit are improvements to this cyclonic technology.

13. The inventions claimed in the '515 Patent, which was granted on 2 May, 1989, include a circular dirt collection chamber below the inner cyclone which has a diameter at the end furthest from the opening of the bottom of the inner cyclone that is at least 3 times the diameter of that cone opening. This design helps to prevent dirt and other debris from re-entering the inner cyclone after being deposited in the collection chamber at the bottom of the inner cyclone.

14. The inventions claimed in the '748 Patent, which was granted on 17 February, 1987, include a disc that surrounds the inner cyclone and is designed, among other things, to prevent larger particles and long strands, such as human hair, from leaving the outer container and clogging the air outlet from the outer container.

15. The inventions claimed in the '008 Patent, which was granted on 1 August, 1989, among other things, contain both a disc and a shroud that surround the inner cyclone. In this patent, the shroud is a covering with perforations that act like a screen and the disc is located below the shroud. The shroud is intended to prevent larger,

lightweight fibrous material from escaping the outer container and the disc helps to prevent larger particles and long strands from clogging the holes of the shroud.

16. The last Patent in Suit, the '038 Patent, which was granted on 12 January, 1999, sets out the distances between the opening of the bottom of the inner cyclone and the base surface of the outer container that are advantageous to dust separation efficiency. This patent includes a claim that requires that the distance between the cone opening and the base surface be either less than 8 mm or between 30 mm and 70 mm.

Analysis of the Technology in the Hoover Fusion

17. Based on my knowledge and experience with vacuum cleaner technology and in particular with cyclonic vacuum cleaner technology, and having observed and, where necessary, measured or tested the Hoover Fusion's parts and how those parts function, it is my opinion that the Hoover Fusion uses Dyson's cyclonic technology and each of the patented improvements described above. As explained in more detail below, the Fusion has the outer container, cone-shaped inner cyclone, dirt collection chamber, shroud and disc described in certain claims of the Patents in Suit.

18. When I ran the Hoover Fusion vacuum cleaner, I observed larger pieces of debris sucked up by the vacuum cleaner, such as pieces of napkin, rotated around the area between the inside surface of the clear container and the inner cyclone apparatus and were deposited at the bottom of the clear container. Because the outer container is clear, I also was able to observe that smaller particles, like dust, that were sucked up by the vacuum cleaner had been deposited in the smaller, separate collection chamber at the base of the inner cyclone.

The '515 Patent

Claim No. 14 of the '515 Patent

19. In my opinion, the Hoover Fusion has each of the elements of claim no. 14 of the '515 Patent and, therefore, infringes that patent. A copy of the '515 Patent is attached hereto as Exhibit 3. The elements of claim no. 14, broken down in an easy-to-follow format, are as follows:

Claim No. 14 of the '515 Patent	Element #
14. A cleaning apparatus comprising:	
(a) an outer container comprising a bottom and a sidewall extending to and meeting the bottom, the sidewall having an interior surface,	14.1
a dirty air inlet at an upper portion of the outer container spaced from the bottom	14.2
and is oriented for supplying dirt laden air into the container tangentially to the interior surface of the outer container	14.3
which has a circular cross-section	14.4
and an air outlet from the container at an upper portion of the container;	14.5
(b) a circular cross-sectioned cyclone with a longitudinal axis mounted inside the container, the cyclone comprising	14.6
a cyclone air inlet at an upper end having a first diameter of the cyclone in air communication with the air outlet of the container,	14.7
an interior dirt rotational surface of frusto-conical shape defining the cyclone for receiving an air flow from the air inlet and for maintaining its velocity to a cone opening smaller in diameter than the diameter of the upper end of the cyclone,	14.8
the air inlet being oriented for supplying air tangentially to the surface,	14.9
an outer surface of frusto-conical shape,	14.10
and a cyclone air outlet communicating with the interior of the cyclone adjacent the upper end of the cyclone;	14.11
(c) a dirt receiving and collecting chamber extending from the bottom of the container to a portion of the outer surface of the cyclone,	14.12

wherein the chamber and cyclone are separable from the outer container	14.13
wherein the receiving chamber has a circular cross-sectioned inner surface around the axis with a minimum diameter furthest from the opening of 3 times the diameter of the cone opening	14.14
and wherein the chamber is open to the bottom of the container to facilitate emptying of the dirt;	14.15
(d) ring seal means between the chamber and outer container; and	14.16
(e) means for generating an air flow	14.17
which passes sequentially through the dirty air inlet, the container, the cyclone air inlet, the cyclone, the receiving chamber and the cyclone air outlet,	14.18
the air flow rotating around the frusto-conical interior surface of the cyclone and the inner surface of the receiving chamber and depositing dirt in the receiving chamber.	14.19

Element 14.1 – "an outer container comprising a bottom and a sidewall extending to and meeting the bottom, the sidewall having an interior surface,"

20. The Hoover Fusion has Element 14.1. It utilizes a clear container – which is called the "Dirt Cup" in the Fusion's Owner's Manual – that has (a) a bottom, (b) a sidewall extending to and meeting the bottom, and (c) the sidewall has an interior surface. These aspects of the Fusion's design are illustrated on the diagram attached hereto as Exhibit 4.

Element 14.2 – "a dirty air inlet at an upper portion of the outer container spaced from the bottom"

21. The Hoover Fusion also has Element 14.2. The "dirty air inlet" described in Element 14.2 is the opening via which the dirty air sucked up by the vacuum cleaner flows into the outer container of the cyclonic apparatus. The Hoover Fusion has such an inlet on its outer container. This dirty air inlet is on the upper portion of the

container above the midline of the container. This aspect of the Fusion's design is shown on the diagram attached hereto as Exhibit 5.

Element 14.3 – "and is oriented for supplying dirt laden air into the container tangentially to the interior surface of the outer container"

22. The Hoover Fusion also has Element 14.3. This element calls for a dirty air inlet that is configured so that dirt laden air sucked up by the vacuum cleaner flows into the outer container tangentially to the interior surface of the outer container. The dirty air inlet on the Fusion is configured to achieve that result. The dirty-air inlet into the Fusion's outer container has a tear-drop shape that is designed and oriented to supply dirt laden air into the outer container tangentially so that it flows to the interior surface of the outer container and rotates around the inside of the container. This tear-drop shape can be seen in the diagram drawn as Figure 3-1 on page 6 of the Hoover Fusion Owner's Manual (the "Owners Manual"). A copy of the relevant portion of that page, with a notation added to the page identifying the dirty air inlet, is attached hereto as Exhibit 6.

23. I was able to confirm that the tear-drop shaped inlet is oriented for tangential air flow by running a simple test. I took a napkin, ripped it into small pieces, and vacuumed the pieces up using the Hoover Fusion. When the napkin pieces entered the outer container through the dirty air inlet, they rotated around the inner surface of the outer container. That rotating motion could only occur if the dirty air was supplied into the container tangentially. If the air had flowed into the container radially inwards, for example, the napkin pieces would have struck the apparatus in the center of the outer container and jumped around in the container in a more random fashion.

Element 14.4 – "which has a circular cross-section"

24. The Hoover Fusion also has Element 14.4. This element requires that the outer container have a circular cross-section. The Fusion's outer container is a cylinder and has a circular cross-section. This was easily observed by me when I held the outer container in my hands and looked down at the top of the container. A similar view of the top of the outer container can be seen in the diagram found at Figure 3-6 on page 7 of the Fusion Owner's Manual, a copy of the relevant portion of which is attached as Exhibit 7. I also measured the diameter of the outer container at several points with a ruler and confirmed its circular nature.

Element 14.5 – "and an air outlet from the container at an upper portion of the container;"

25. The Hoover Fusion also has Element 14.5. This element requires that there be an air outlet in the upper half of the outer container through which the air circulating in the outer container can move from that container into the inner, cone-shaped cyclone mounted within the container (which is discussed further below). The Hoover Fusion has such an air outlet, which I observed when I removed the outer container assembly from the vacuum cleaner and took its pieces apart. Inside the outer container, there is a perforated "shroud" which has a circular cross-section and is mounted on and surrounds the outside surface of the inner cyclone at the upper portion of the outer container but leaves sufficient space between it and the inner cyclone to allow air to flow through the shroud and up the outer surface of the inner cyclone and into a cyclone air inlet (discussed further below). A diagram illustrating the location of the shroud within the outer container is attached hereto as Exhibit 8. Based on my

examination of the shroud, my observation of the machine in running mode, and my own experience with and knowledge of such devices, I can say that the shroud forms an air outlet for the air circulating in the outer container to travel to the inner cyclone.

Element 14.6 – "(b) a circular cross-sectioned cyclone with a longitudinal axis mounted inside the container, the cyclone comprising"

26. The Hoover Fusion also has Element 14.6. This element requires that a circular cross-sectioned cyclone – or a device using centrifugal force to separate materials from the air – with a longitudinal axis be mounted inside the outer container. The Hoover Fusion has such a device. As was explained in the preceding paragraph, among the apparatus inside the Fusion's outer container is a cone-shaped cyclone, which I observed has a circular cross-section and is mounted with a longitudinal axis in approximately the center of the container. A diagram illustrating the location of this cone-shaped cyclone is attached as Exhibit 9.

Element 14.7 – "a cyclone air inlet at an upper end having a first diameter of the cyclone in air communication with the air outlet of the container,"

27. The Hoover Fusion also has Element 14.7. This element requires that there be an "air inlet" on the top portion of the inner cyclone into which air from the outer cyclone's air outlet can pass. When I took apart the apparatus inside the Fusion's container, I observed an air inlet formed by moulded openings at the upper end or top of the inner cone-shaped cyclone that allowed air to pass from the outer cyclone's air outlet to the cone-shaped inner cyclone. A photograph of the Fusion's cone-shaped inner cyclone, with notations on it showing the location of the moulded openings on the cyclone, is attached as Exhibit 10. I also observed that there was a space between the

container air outlet (or shroud) and the outer surface of the inner cyclone which leads to the moulded openings at the top of the cyclone. A diagram depicting these parts is attached as Exhibit 11. Based on my examination of these parts, and my own experience with and knowledge of cyclonic vacuum cleaner technology, this space is designed to and does permit air communication between the air outlet (or shroud) and the air inlet to the inner cyclone.

Element 14.8 – "an interior dirt rotational surface of frusto-conical shape defining the cyclone for receiving an air flow from the air inlet and for maintaining its velocity to a cone opening smaller in diameter than the diameter of the upper end of the cyclone,"

28. The Hoover Fusion also has Element 14.8. This element requires that the cyclone inside the container have "an interior dirt rotational surface of frusto-conical shape defining the cyclone" and that this shape be "for receiving an air flow from the air inlet and for maintaining its velocity to a cone opening smaller in diameter than the diameter of the upper end of the cyclone." The cyclone inside the Hoover Fusion's container meets this standard. A cyclone of "frusto-conical" shape is a cone-shaped device that has parallel cuts at the top and bottom of the cone. By definition, the opening at one end of this device (here, the bottom end) has a diameter that is smaller than the diameter of the opening at the other end of the device (here, the top end). As can be seen from the photographs with notations on them attached as Exhibit 12, the Fusion's inner cyclone is cone shaped both on the inside and outside surface and has parallel cuts at the top and bottom. Based on my examination of the inner cyclone, and my knowledge of the operation of cone-shaped cyclones in a cyclonic vacuum cleaner, I also can say that the interior surface of the inner cyclone is designed for receiving an air flow from the air

inlets at that top of the cyclone and for maintaining its velocity as it makes its way from the top of the cyclone to the cone opening at the bottom of the cyclone. The words "maintaining its velocity" as used in Element 14.8 of the '515 Patent mean that the conical shape of the cyclone assists in keeping the air flow moving as it makes its way from the air inlets at the top of the cyclone to the smaller cone opening at the bottom of the cyclone. It is a recognized principle of cyclone technology that air entering the top of the cyclone tangentially will rotate to the bottom of the cyclone.

- **Element 14.9 – "the air inlet being oriented for supplying air tangentially to the surface,"**

29. The Hoover Fusion also has Element 14.9. This element requires that the air inlet to the inner cyclone be oriented such that the air flows from the outer container into the inner cyclone tangentially so that it rotates around the inner surface of the inner cyclone. The air inlet to the Hoover Fusion's inner cyclone is so oriented. The moulded openings at the upper end of the Hoover Fusion's inner cyclone, which form the air inlet to the cyclone, are shaped so that air will flow into the cyclone tangentially and rotate around the inner surface of the cyclone. A photograph of the inner cyclone, with notations depicting how the air flows into these moulded openings, is attached as Exhibit 13. Indeed, the cyclone would not work properly if the facts were otherwise. As explained in paragraph 23 above, tangential air flow is necessary to attain rotating air flow, and the centrifugal force created by that rotating air flow, in the cyclone.

Element 14.10 – "an outer surface of frusto-conical shape,"

30. The Hoover Fusion also has Element 14.10. As explained in paragraph 28 above, the outer surface of the inner cyclone, as well as the inner surface of that cyclone, has a frusto-conical shape.

Element 14.11 – "and a cyclone air outlet communicating with the interior of the cyclone adjacent the upper end of the cyclone;"

31. The Hoover Fusion also has Element 14.11. This element requires that there be an air outlet at the upper portion of the inner cyclone which allows air that has already traveled down the inner surface of the cyclone to escape from the interior of the cyclone. It is a principle of cyclonic vacuum technology that air rotating down the interior surface of a frusto-conical cyclone will travel back up the center of the cyclone. The Hoover Fusion has an "air outlet communicating with the interior of the cyclone adjacent the upper end of the cyclone." This air outlet can be seen on the component shown in the photograph attached as Exhibit 14. This component sits on the upper end of the cyclone, namely the top of the cyclone, and has a tube that extends from the component into the center of the cyclone. When the air flowing upward in the middle of the inner cyclone reaches the tube, it escapes from the inner cyclone through the tube on the component.

Element 14.12 – "(c) a dirt receiving and collecting chamber extending from the bottom of the container to a portion of the outer surface of the cyclone,"

32. The Hoover Fusion also has Element 14.12. This element requires that there be a dirt collection chamber extending from the bottom of the outer container to a portion of the outer surface of the cyclone. The Hoover Fusion contains such a

chamber. It is a circular chamber that, at the top, is made of plastic and, at the bottom, is made of a rubber-like material. A photograph of this dirt collection chamber is attached as Exhibit 15. As can be seen from diagrams contained in the Hoover Fusion's Owner's Manual, when in place, this chamber extends from the bottom of the container to a portion of the outer surface of the cyclone. See, e.g., extract of diagram shown in Figure 3-1 on page 6 of the Owner's Manual, with a notation identifying where the dirt collection chamber is situated within the Fusion's container, attached as Exhibit 16.

Element 14.13 – "wherein the chamber and cyclone are separable from the outer container

33. The Hoover Fusion also has Element 14.13. This element requires that the inner cyclone and the dirt collection chamber below it be able to be separated from the outer container. (Generally, a reason for separating these items would be to clean them.) The Hoover Fusion's chamber and cyclone are separable from the outer container. The Fusion's Owner's Manual shows you how to do this in the diagrams shown in Figures 3-6 and 3-7 on page 7 of the manual, a copy of which is attached as Exhibit 17.

Element 14.14 – "wherein the receiving chamber has a circular cross-sectioned inner surface around the axis with a minimum diameter furthest from the opening of 3 times the diameter of the cone opening"

34. The Hoover Fusion also has Element 14.14. This element requires that the dirt receiving chamber beneath the inner cyclone have an inner surface that is circular and a diameter at the end of the chamber furthest from the opening at the bottom of the cone-shaped inner cyclone that is a minimum of 3 times the diameter of that opening. The dirt receiving chamber on the Fusion meets both of these requirements. As

can be seen from the photograph attached as Exhibit 15, the Fusion's receiving chamber does have a circular cross-sectioned inner surface around the axis of the inner cyclone. The diameter of this chamber furthest from the cone opening, which in my opinion is the rubber-like portion of the chamber that touches the bottom of the container, is also a minimum of 3 times the diameter of the cone opening. Using a measuring device known as a shadowgraph, I took several measurements of the diameter of the rubber-like portion of the dirt receiving chamber furthest from the cone opening at different locations. The average of those measurements was about 90.6 millimeters ("mm"). I also took several measurements of the diameter of the cone opening using a coordinate measuring machine. The average of those measurements was about 29.10 mm. Thus, the diameter of the dirt receiving chamber furthest from the cone opening is about 3.11 times the diameter of the cone opening. (I should add here that even if the relevant diameter of the receiving chamber is viewed as the end of the plastic portion of the chamber – and not the rubber-like extension – that diameter is about 86.41 mm using Mitutoyo calipers, which is about 2.97 times the diameter of the cone opening. Although I do not believe this to be the proper measurement of the diameter of the receiving chamber "furthest from the opening," it is nevertheless, rounded off to the nearest tenth, three times the diameter of the cone opening.)

Element 14.15 – "and wherein the chamber is open to the bottom of the container to facilitate emptying of the dirt;"

35. The Hoover Fusion also has Element 14.15. This element requires that the chamber be open to the bottom of the outer container so that dirt collected in the chamber can be removed. The Hoover Fusion's dirt collection chamber has this feature.

The diagram in Figure 3-3 on page 7 of the Fusion's Owner's Manual illustrates how the opening in the bottom of the chamber facilitates emptying of the dirt. A copy of the relevant portion of that manual page, with notations, is attached hereto as Exhibit 17.

Element 14.16 – "(d) ring seal means between the chamber and outer container; and"

36. The Hoover Fusion also has Element 14.16. This element describes a ring-shaped seal that surrounds the area where the dirt collection chamber meets the container. As discussed above (¶ 32), the entire bottom portion of the Hoover Fusion's circular collection chamber is a rubber-like material that acts as a ring seal surrounding the area where the dirt collection chamber meets the container. Thus, element 14.16 is present in the Hoover Fusion.

Element 14.17 – "(e) means for generating an air flow"

37. The Hoover Fusion also has Element 14.17. The "means for generating an air flow" in the patent is a motor driven fan unit. The Hoover Fusion has such a motor driven fan unit.

Element 14.18 – "which passes sequentially through the dirty air inlet, the container, the cyclone air inlet, the cyclone, the receiving chamber and the cyclone air outlet,"

38. The Hoover Fusion also has Element 14.18. This element requires that air sucked up by the vacuum cleaner pass through the cyclonic apparatus of the vacuum cleaner in the following order: first, it passes through the dirty air inlet into the outer container; second, it passes from the outer container to the air inlet at the top of the inner, cone-shaped cyclone; third, it passes down the cone-shaped cyclone into the dirt receiving chamber; and fourth, it passes up the inner cyclone through the center and into

the air outlet at the upper portion of the cyclone. The air flow in the Hoover Fusion does exactly this. The air flow sequence is discussed above in the paragraphs dealing with Element Nos. 14.3, 14.5, 14.7, 14.8 and 14.11 (¶¶ 22, 23, 25, 27, 28 and 31). As explained in those paragraphs, based on my examination and testing of the machine and my knowledge of the use of cyclonic technology in a vacuum cleaner, dirty air sucked up by the Hoover Fusion vacuum cleaner initially flows tangentially into the clear container of the vacuum cleaner through the tear-shaped dirty air inlet, where it rotates around at a high speed (forcing debris to hit the wall of the container and fall to the bottom). Air then flows through the shroud and into the cone-shaped inner cyclone tangentially through the air inlet at the top of the inner cyclone. It then rotates down the cone-shaped inner cyclone at an even higher rate of speed (forcing smaller particles towards the inner surface of the inner cyclone), passes through the cone opening, and proceeds into a dirt collection chamber and escapes back up the cone and into the tube of the air outlet situated at the top, center portion of the cone.

Element 14.19 – "the air flow rotating around the frusto-conical interior surface of the cyclone and the inner surface of the receiving chamber and depositing dirt in the receiving chamber."

39. The Hoover Fusion also has Element 14.19, the last element of claim no. 14 of the '515 Patent. This element requires that air traveling down the interior surface of the inner cyclone and into the collection chamber be rotating and that dirt be deposited in the collection chamber. Air inside the Hoover Fusion's inner cyclone and chamber does this. As discussed above in reference to Element 14.9 (¶ 29), the Fusion's inner cyclone separates small particles from the air and deposits them in the collection chamber below the cyclone by forcing air that comes into the cyclone to rotate around the

inner surface of the cyclone and the collection chamber. This is confirmed by the fact that fine particles were deposited at the bottom of the collection chamber when I ran the vacuum cleaner. If the air flowing down the inner cyclone did not rotate at a very high rate of speed on its way down, the centrifugal force necessary to separate these fine particles from the air would not have existed. I was able to confirm that the air flow continues to rotate when it leaves the cone opening and enters the collection chamber by a simple experiment. I (a) removed the Fusion's container and internal apparatus from the vacuum cleaner; (b) opened the bottom of the container and placed small pieces of napkin in the collection chamber; (c) closed the container bottom; (d) attached the vacuum cleaner hose from a second Hoover Fusion vacuum cleaner to the air outlet at the top of the container to stimulate air flow through the container apparatus; and (e) turned the vacuum cleaner on. Through the clear bottom of the container, I observed that the napkin pieces were rotating in the collection chamber.

The '748 Patent

40. In my opinion, the Hoover Fusion also has each of the elements of claim nos. 15, 16 and 17 of the '748 Patent and, therefore, infringes that patent. A copy of the '748 Patent is attached hereto as Exhibit 18.

Claim No. 15 of the '748 Patent

41. The elements of claim no. 15 of the '748 Patent, broken down in an easy-to-follow format, are as follows:

Claim No. 15 of the '748 Patent	Element #
15. In a cleaning apparatus including	
an outer container comprising a bottom and a sidewall extending to and meeting the bottom, the sidewall having an interior surface,	15.1
a dirty air inlet at an upper portion of the outer container spaced from the bottom	15.2
which is oriented for supplying dirt laden air into the container tangentially to the interior surface of the outer container	15.3
which has a circular cross-section	15.4
and an air outlet from the container at the upper portion of the container;	15.5
a circular cross-sectioned cyclone having a longitudinal axis and mounted inside the container, the cyclone comprising	15.6
a cyclone air inlet at an upper end having a first diameter of the cyclone in air communication with the air outlet of the container,	15.7
an interior dirt rotational surface of frusto-conical shape for receiving an air flow from the air inlet and for maintaining its velocity to a cone opening smaller in diameter than the diameter of the upper end of the cyclone,	15.8
the air inlet being oriented for supplying air tangentially to the surface,	15.9
an outer surface of frusto-conical shape,	15.10
and a cyclone air outlet communicating with the interior of the cyclone adjacent the upper end of the cyclone;	15.11
a dirt receiving and collecting chamber extending from the cone opening;	15.12
and means for generating an air flow	15.13
which passes sequentially through the dirty air inlet, the container, the cyclone air inlet, the cyclone, the receiving chamber and the cyclone air outlet,	15.14
the air flow rotating around the frusto-conical interior surface of the cyclone and depositing the dirt in the receiving chamber	15.15

the improvement which comprises: a disc means provided on the outside of the cyclone intermediate the receiving chamber and the air outlet of the container and around to the longitudinal axis of the cyclone	15.16
with a space between the interior surface of the container and the disc means for passage of air	15.17
wherein the disc means retards long strands in the dirt from clogging the air outlet and retains the strands in the container.	15.18

Elements 15.1 through to 15.11

42. Elements 15.1 through to 15.11 of the '748 Patent are either the same as Elements 14.1 through to 14.11 of the '515 Patent or differ from those elements in ways that are immaterial here. Thus, for the reasons discussed above (¶¶ 20-31), the Hoover Fusion has Elements 15.1 through to 15.11 of the '748 Patent.

Element 15.12 – "a dirt receiving and collecting chamber extending from the cone opening;"

43. The Hoover Fusion also has Element 15.12. This element describes the same dirt collection chamber described in Element 14.12 of the '515 Patent (i.e., "a dirt receiving and collection chamber extending from the bottom of the container to a portion of the outer surface of the cyclone"). As indicated, the Hoover Fusion contains such a chamber. It is the circular chamber shown in Exhibit 15 that, at the top, is made of plastic and, at the bottom, is made of a rubber-like material. As can be seen from diagrams contained in the Hoover Fusion's Owner's Manual, when in place, this chamber extends from the inner cyclone's cone opening. See, e.g., diagram shown in Figure 3-1 on page 6 of the Owner's Manual, with a notation identifying where the dirt collecting and receiving chamber is situated within the Fusion's container, attached as Exhibit 16.

Element 15.13 – "and means for generating an air flow"

44. Element 15.13 of the '748 Patent requires a "means for generating an air flow." The "means for generating an air flow" in the patent is a fan unit. The Hoover Fusion has such a fan unit.

Element 15.14 – "which passes sequentially through the dirty air inlet, the container, the cyclone air inlet, the cyclone, the receiving chamber and the cyclone air outlet,"

45. Element 15.14 of the '748 Patent is the same as Element 14.18 of the '515 Patent. Thus, for the reasons discussed above (¶ 38), the Hoover Fusion has Element 15.14 of the '748 Patent.

Element 15.15 – "the air flow rotating around the frusto-conical interior surface of the cyclone and depositing the dirt in the receiving chamber"

46. The Hoover Fusion also has Element 15.15. This element requires that air traveling down the interior surface of the inner cyclone be rotating and that dirt be deposited in the collection chamber. As discussed above (¶ 39), air inside the Hoover Fusion's inner cyclone and chamber does this.

Element 15.16 – "the improvement which comprises: a disc means provided on the outside of the cyclone intermediate the receiving chamber and the air outlet of the container and around to the longitudinal axis of the cyclone"

47. The Hoover Fusion also has Element 15.16. The words of Element 15.16 describe a disc which is on the outside of the inner cyclone between the dirt collection chamber and the air outlet of the outer container. The Hoover Fusion has such a disc. A photograph of the disc by itself is attached as Exhibit 19. When in its proper place, this disc sits around the outside of the inner cyclone immediately under the shroud

and immediately above the dirt collection chamber, and is attached to the shroud and inner cyclone. The longitudinal axis of the inner cyclone passes through the center of the top and bottom openings of the inner cyclone. Thus, because the disc sits around the outside of the inner cyclone, the disc also is around the longitudinal axis of the inner cyclone. A photograph, with notations, showing where the disc is situated on the cyclonic apparatus, is attached as Exhibit 20.

Element 15.17 – "with a space between the interior surface of the container and the disc means for passage of air"

48. The Hoover Fusion also has Element 15.17. This element requires that there be a physical space between the disc means and the interior wall of the outer container so that air can pass through that space. Such a space exists between the disc means surrounding the Fusion's inner cyclone and the interior wall of the Fusion's outer container. A diagram illustrating this space is attached hereto as Exhibit 21.

Element 15.18 – "wherein the disc means retards long strands in the dirt from clogging the air outlet and retains the strands in the container."

49. The Hoover Fusion also has Element 15.18, which is the last element of claim no. 15 of the '748 Patent. This element states that the disc means described above helps to retard long strands in the dirt from clogging the air outlet from the outer container and retains them in the outer container. In my opinion, based on my expertise and experience, I believe that the Fusion's disc means performs this function.

Claim No. 16 of the '748 Patent

50. Claim no. 16 of the '748 Patent has the following element:

"The apparatus of claim 15 wherein the disc means is circular around the longitudinal axis of the cyclone."

51. This element requires that the disc means described above be circular in shape and situated around the inner cyclone. The Hoover Fusion clearly has these elements. The disc means described above is circular and, as explained in paragraph 47, above, when in its proper place, it is situated around the longitudinal axis of the inner cyclone.

Claim No. 17 of the '748 Patent

52. Claim no. 17 of the '748 Patent has the following elements:

> "The apparatus of claim 16 wherein the disc means is conical in shape around the longitudinal axis with a smaller opening attached to the outer surface of the cyclone and a larger opening below the smaller opening facing the bottom of the container such that there is a tapered wall between the openings."

53. The disc on the Hoover Fusion has all of these elements. It has a conical shape. It is situated around the cyclone. As discussed in paragraph 47, it is situated around the longitudinal axis of the inner cyclone. And, the smaller opening of the conical disc is physically attached to the outer surface of the inner cyclone by three screws, with the larger opening below the smaller opening and facing the bottom of the container, giving the disc a tapered look. A photograph of the disc, with notations pointing out these elements, is attached hereto as Exhibit 22.

The '008 Patent

54. In my opinion, the Hoover Fusion also has each of the elements of claim nos. 1, 2, 3, 7, 11, 23, 24 and 25 of the '008 Patent and, therefore, infringes that patent. A copy of the '008 Patent is attached hereto as Exhibit 23.

Claim No. 1 of the '008 Patent

55. The elements of claim no. 1 of the '008 Patent, broken down in an easy-to-follow format, are as follows:

Claim No. 1 of the '008 Patent	Element #
1. In a cleaning apparatus including	
an outer container comprising a bottom and a sidewall extending to and meeting the bottom, the sidewall having an interior surface,	1.1
a dirty air inlet which is oriented for supplying dirt laden air into the container tangentially to the interior surface of the outer container	1.2
which has a circular cross-section	1.3
and an air outlet from the container;	1.4
a circular cross-sectioned cyclone having a longitudinal axis mounted inside the container, the cyclone comprising	1.5
a cyclone air inlet at an upper end having a first diameter of the cyclone in air communication with the air outlet of the container,	1.6
an interior dirt rotational surface of frusto-conical shape for receiving an air flow from the air inlet and for maintaining its velocity to a cone opening smaller in diameter than the diameter of the upper end of the cyclone,	1.7
the air inlet being oriented for supplying air tangentially to the surface,	1.8
an outer surface of frusto-conical shape,	1.9
and a cyclone air outlet communicating with the interior of the cyclone adjacent the upper end of the cyclone;	1.10
a dirt receiving and collecting chamber extending from the cone opening;	1.11
and means for generating an air flow	1.12
which passes sequentially through the dirty air inlet, the container, the cyclone air inlet, the cyclone, the receiving chamber and the cyclone air outlet,	1.13
the air flow rotating around the frusto-conical interior surface of the cyclone and depositing the dirt in the receiving chamber	1.14

the improvement which comprises:	
(a) a shroud means mounted on and around the outer surface of the cyclone and having opposed ends along the longitudinal axis and providing for outlet air from the container into the air inlet to the cyclone	1.15
wherein the shroud means is mounted at one end below the air inlet to the cyclone and extends along the outer surface with the other end at a position intermediate to the cone opening and the air inlet to the cyclone,	1.16
wherein the shroud means contacts the outer surface of the cyclone for closure at the other of the ends	1.17
and wherein the shroud means has perforations adjacent to the position intermediate to the cone opening for the flow of air from the outer container to the cyclone inlet; and	1.18
(b) disc means provided on the shroud means at a lower longitudinal extent of the shroud means and the air inlet of the cyclone and around the axis of the cyclone	1.19
with a space between the interior surface of the container and the disc means for passage of air,	1.20
wherein the disc means aids in dirt removal in the first container by preventing some of the dirt from flowing into the air inlet to the cyclone.	1.21

Elements 1.1 through to 1.10

56. Elements 1.1 through to 1.10 of the '008 Patent are either the same as Elements 14.1 and 14.3 through to 14.11 of the '515 Patent or differ from those elements in ways that are immaterial here. Thus, for the reasons discussed above (¶¶ 20, 22-31), the Hoover Fusion has Elements 1.1 through to 1.10 of the '008 Patent.

Element 1.11

57. Element 1.11 of the '008 Patent is identical to Element 15.12 of the '748 Patent. Thus, for the reasons discussed above (¶ 43), the Hoover Fusion has Element 1.11 of the '008 Patent.

Element 1.12 – "and means for generating an air flow"

58. Element 1.12 of the '008 Patent requires a "means for generating an air flow." The "means for generating an air flow" in the patent is a fan unit. The Hoover Fusion has such a fan unit.

Element 1.13 – "which passes sequentially through the dirty air inlet, the container, the cyclone air inlet, the cyclone, the receiving chamber and the cyclone air outlet,"

59. Element 1.13 of the '008 Patent is identical to Element 14.18 of the '515 Patent. Thus, for the reasons discussed above (¶ 38), the Hoover Fusion has Element 1.13 of the '008 Patent.

Element 1.14 – "the air flow rotating around the frusto-conical interior surface of the cyclone and depositing the dirt in the receiving chamber"

60. The Hoover Fusion also has Element 1.14. This element requires that air traveling down the interior surface of the inner cyclone be rotating and that dirt be deposited in the collection chamber. As discussed above (¶ 39), air inside the Hoover Fusion's inner cyclone and chamber does this.

Element 1.15 – "(a) a shroud means mounted on and around the outer surface of the cyclone and having opposed ends along the longitudinal axis and providing for outlet air from the container into the air inlet to the cyclone"

61. The Hoover Fusion also has Element 1.15. This element requires that a shroud means designed to act as an air outlet from the outer container to the air inlet of the inner cyclone be mounted on and around the outer surface of the cone-shaped inner cyclone and have opposing ends along the longitudinal axis of the inner cyclone. As was discussed in connection with Element 14.5 of the '515 Patent (¶ 25), the Hoover

Fusion has a shroud means which has a circular cross-section and is mounted on and around the outer surface of the inner cyclone that provides an outlet for air to pass from the container into the air inlet to the inner cyclone. The longitudinal axis of the inner cyclone passes through the center of the top and bottom openings of the inner cyclone. Thus, because the shroud has a circular cross-section and it sits around the outside of the inner cyclone, its opposing ends are also along the longitudinal axis of the inner cyclone.

Element 1.16 – "wherein the shroud means is mounted at one end below the air inlet to the cyclone and extends along the outer surface with the other end at a position intermediate to the cone opening and the air inlet to the cyclone,"

62. The Hoover Fusion also has Element 1.16. This element requires the shroud means to be positioned below the air inlet to the cone-shaped cyclone and extend along the outer surface of the inner cyclone to a position somewhere before the cone opening at the bottom of the inner cyclone. I have examined the location of the component on the Hoover Fusion containing the shroud and have concluded that it meets these requirements. The component is mounted such that the shroud begins at a point several centimeters ("cm") below the air inlet to the inner cyclone and it extends down along the outer surface of the inner cyclone to a point approximately 9 cm above the cone opening at the bottom of the cyclone. A photograph, with notations, showing where the shroud means is located in respect to the air inlet and cone opening is attached as Exhibit 24.

Element 1.17 – "wherein the shroud means contacts the outer surface of the cyclone for closure at the other of the ends"

63. The Hoover Fusion also has Element 1.17. This element requires that the bottom end of the shroud means touch the outer surface of the inner cyclone at

the point where the shroud means ends. Based on my examination of the Fusion's shroud means, its bottom end touches the outer surface of the inner cyclone where the shroud means ends. In fact, the bottom end of the shroud means is fastened to the outer surface of the cyclones by screws. A photograph, with notations, showing the location of the bottom of the shroud means is attached as Exhibit 25.

Element 1.18 – "and wherein the shroud means has perforations adjacent to the position intermediate to the cone opening for the flow of air from the outer container to the cyclone inlet; and"

64. The Hoover Fusion also has Element 1.18. This element requires that the shroud means have perforations adjacent that portion of the shroud positioned between the air inlet to the inner cyclone and the cone opening at the bottom of the inner cyclone so that air can pass through the perforations to the air inlet of the inner cyclone. As discussed above (¶ 25), the Fusion's shroud does have these perforations. The perforations are adjacent that portion of the shroud positioned between the air inlet to the inner cyclone and the cone opening at the bottom of the inner cyclone so that air can pass through the perforations to the air inlet of the inner cyclone.

Element 1.19 – "(b) disc means provided on the shroud means at a lower longitudinal extent of the shroud means and the air inlet of the cyclone and around the axis of the cyclone"

65. The Hoover Fusion also has Element 1.19. This element requires that a disc means must surround the axis of the inner cyclone and touch the bottom portion of the shroud. The Hoover Fusion has such a disc means. As explained (¶¶ 47 and 53), it surrounds the axis of the inner cyclone and is fastened to the bottom portion of the shroud means by screws.

Element 1.20 – "with a space between the interior surface of the container and the disc means for passage of air,"

66. This element is the same as Element 15.17 of the '748 Patent. Thus, for the reasons discussed above (¶ 48), the Hoover Fusion has Element 1.20 of the '008 Patent.

Element 1.21 – "wherein the disc means aids in dirt removal in the first container by preventing some of the dirt from flowing into the air inlet to the cyclone."

67. The Hoover Fusion also has Element 1.21, which is the last element of claim no. 1 of the '008 Patent. This element states that the disc means described above assists in preventing some dirt from flowing out of the outer container and into the inner cyclone. In my opinion, based on my expertise and experience, I believe that the Fusion's disc means performs this function.

Claim No. 2 of the '008 Patent

68. Claim no. 2 of the '008 Patent has the following elements:

"The apparatus of claim 1 wherein the disc means is circular in cross-section around the longitudinal axis of the cyclone."

69. The Hoover Fusion has these elements. As discussed above in paragraph 51, the disc mounted under the shroud is circular and, as explained in paragraph 47 above, when in its proper place, it is situated around the longitudinal axis of the inner cyclone.

Claim No. 3 of the '008 Patent

70. Claim no. 3 of the '008 Patent has the following elements:

"The apparatus of claim 1 wherein the disc means has a conical shape around the shroud means such that a larger

portion of the conical shape faces towards the bottom of the container."

71. The Hoover Fusion has these elements. As discussed in paragraph 53 above, the Fusion's disc means is conical in shape, with the larger portion of the conical shape facing toward the bottom of the container.

Claim No. 7 of the '008 Patent

72. Claim no. 7 of the '008 Patent has the following element:

"The apparatus of claim 1 wherein the disc means is positioned about one-third of the distance between the cone opening and the air inlet of the cyclone"

73. The Hoover Fusion has this element. Using an electronic height gauge, I determined that the distance between the bottom of the Fusion's disc and the cone opening on the bottom of the inner cyclone was about 63.89 mm. I also determined that the total distance between the mid-point of the air inlet and the cone opening at the bottom of the inner cyclone was about 215.59 mm. Thus, the disc on the Fusion is set at a position slightly less than one-third of the distance between the cone opening and the air inlet (63.89/215.59 or about 29.6%). Had I chosen to measure from the midpoint of the disc rather than the top of the disc, which I believe would have been reasonable to do, this distance would have been 33.03% – almost exactly one-third of the distance between the cone opening and the air inlet of the cyclone.

Claim No. 11 of the '008 Patent

74. Claim no. 11 of the '008 Patent has the following element:

"The apparatus of claim 1 wherein the outer container has a substantially cylindrical sidewall."

75. The Hoover Fusion has this element. As explained in paragraph 24 above, the outer container has a circular cross-section.

Claim Nos. 23 through to 25 of the '008 Patent

76. The elements of claim nos. 23 through to 25 of the '008 Patent are either the same as the elements of claim nos. 1 through to 3 of the '008 patent or differ from those elements in ways that are immaterial here. Thus, for the reasons discussed above (¶¶ 56-71), the Hoover Fusion has all of the elements of claim nos. 23 through to 25 of the '008 Patent.

The '038 Patent

77. In my opinion, the Hoover Fusion also has each of the elements, or an equivalent thereof, of claim nos. 1, 2, 3, 7, 13 and 14 of the '038 Patent and, therefore, infringes that patent. A copy of the '038 Patent is attached hereto as Exhibit 26.

Claim No. 1 of the '038 Patent

78. The elements of claim no. 1 of the '038 Patent, broken down in an easy-to-follow format, are as follows:

Claim No. 1 of the '038 Patent	Element #
1. Vacuum cleaner apparatus for separating dirt or dust from an airflow comprising	
a frustoconical cyclone	1.1
having a tangential air inlet located at or adjacent the end of the cyclone having the larger diameter	1.2
and a cone opening located at the end of the cyclone having a smaller diameter than at the end having the larger diameter,	1.3
and a collector arranged so as to surround the cone opening and having a base surface facing towards the cone opening,	1.4

wherein the distance between the cone opening and the base surface is either less than 8 mm or between 30 mm and 70 mm	1.5
such that there is improved separation of the dirt or dust because of the distance in the apparatus.	1.6

Element 1.1 – "a frustoconical cyclone"

79. The Hoover Fusion has Element 1.1 of the '038 Patent. This element requires that the vacuum cleaner apparatus have a frustoconical cyclone. As discussed above in reference to Element Nos. 14.8 and 14.10 of the '515 Patent (¶¶ 28 and 30), the inner cyclone of the Hoover Fusion is a frustoconical cyclone.

Element 1.2 – "having a tangential air inlet located at or adjacent the end of the cyclone having the larger diameter"

80. The Hoover Fusion also has Element 1.2 of the '038 Patent. This element requires a tangential air inlet at or adjacent the end of the inner cyclone having the larger diameter, which is the end of the inner cyclone nearest the top of the container. The Hoover Fusion has a tangential air inlet (see ¶ 29), and it is located adjacent the end of the cyclone having the larger diameter.

Element 1.3 – "and a cone opening located at the end of the cyclone having a smaller diameter than at the end having the larger diameter,"

81. The Hoover Fusion has Element 1.3 of the '038 Patent. This element requires that there be a cone opening located at the end of the inner cyclone (or bottom of the inner cyclone) that has a smaller diameter than the end of the inner cyclone having the larger diameter (or at the top of the inner cyclone). I observed that the diameter of the opening at the bottom of the inner cyclone is smaller than the diameter of the opening at the top of the inner cyclone.

Element 1.4 – "and a collector arranged so as to surround the cone opening and having a base surface facing towards the cone opening,"

82. The Hoover Fusion has Element 1.4 of the '038 Patent. This element requires that there be a collector that surrounds the cone opening at the bottom of the inner cyclone that has a base surface facing towards the cone opening. The dirt collection chamber discussed above (¶ 32), meets this requirement. It surrounds the cone opening at the bottom of the inner cyclone and has a base surface facing towards that cone opening.

Element 1.5 – "wherein the distance between the cone opening and the base surface is either less than 8 mm or between 30 mm and 70 mm"

83. Element 1.5 of the '038 Patent requires that the distance between the cone opening at the bottom of the inner cyclone and the base surface of the container be either less than 8 mm or between 30 mm and 70 mm. I have measured the distance between the cone opening at the bottom of the inner cyclone and the base surface of the container on two of the new Hoover Fusions that were in my possession using a coordinate measuring machine. The distance on the first Hoover Fusion was 70.75 mm and the distance on the second Hoover Fusion was 70.89 mm, for an average distance of 70.82 mm. This average distance is slightly above the range set out in Element 1.5. I am informed, however, that where an accused device does not fall within the literal words of a claim element, there is a U.S. legal doctrine providing that if the accused device performs substantially the same function in substantially the same way to achieve substantially the same result as the claim element, it will be considered an equivalent of that claim element and infringement may still be found. In my opinion, this doctrine should be applied here. As set forth in this claim, the function of setting the distance

between the cone opening at the bottom of the inner cyclone and the base surface of the container to a particular value is to achieve improved dirt or dust separation. This is the function of setting the distance between the cone opening at the bottom of the inner cyclone and the base surface of the container of the Hoover Fusion at about 70.82 mm. The way this is achieved in the claim element is by setting the distance at less than 8 mm or between 30 mm and 70 mm. The way this achieved in the Hoover Fusion is by setting a distance that is less than 1 mm outside the range called for in Element 1.5 of the '038 Patent, which ~~is~~ substantially the same as the claim element. As is discussed in the next paragraph, by setting the distance between the cone opening and the base surface in the Hoover Fusion at about 70.82 mm, the Hoover Fusion is able to achieve the result of improved separation of dirt or dust from air; this is the same result as the claim element.

Element 1.6 – "such that there is improved separation of the dirt or dust because of the distance in the apparatus."

84. Element 1.6, which is the last element of claim no. 1 of the '038 Patent, states that setting the distance between the cone opening and the base surface at either less than 8 mm or between 30 mm and 70 mm improves the separation of dirt or dust from air. The distance between the cone opening and the base surface on the Hoover Fusion performs this function. Using a standard test dust known as R10, I tested the dust separation efficiency of the Hoover Fusion cyclonic apparatus using apparatus that had a distance between the cone opening at the bottom of the inner cyclone and the base surface of the container set at about 70.82 mm (*see* ¶ 83) – and determined that approximately 10.14% of the dust sucked into that cyclonic apparatus was not collected by the apparatus. Using the same standard test dust, I then tested the dust separation

efficiency of a Hoover Fusion cyclonic apparatus using apparatus that had been modified so that the distance between the cone opening at the bottom of the inner cyclone and the base surface of the container was 100 mm (the "modified cyclonic cleaning apparatus"). The modification included extending the length of the dirt collection chamber by about 30 mm and dropping that portion of the bottom of the outer container forming the bottom of the dirt collection chamber by the same distance. The depth of the outer container surrounding the dirt collection chamber was not altered. I determined that approximately 10.84% of the dust sucked into the modified cyclonic cleaning apparatus was not collected by that apparatus. Thus, the tests showed there was about a 7% dust separation improvement at a distance of approximately 70.82 mm over a distance of 100 mm. Because the geometry of the outer container remained the same, it is my opinion that the observed change in dust separation efficiency of the apparatus occurred only in the inner cyclone and was due entirely to the change in the distance between the cone opening and the bottom of the inner cyclone.

Claim No. 2 of the '038 Patent

85. Claim no. 2 of the '038 Patent has the following element:

"Apparatus as claimed in claim 1, wherein the base surface is substantially planar."

86. The Hoover Fusion has this element. This element requires that the base surface below the cone opening be substantially planar. I have examined the base surface of the container below the cone opening and have found that it is substantially planar. A diagram illustrating the planar nature of the base surface is attached hereto as Exhibit 27.

Claim No. 3 of the '038 Patent

87. Claim no. 3 of the '038 Patent has the following element:

> "Apparatus as claimed in claim 2, wherein the distance between the cone opening and the base surface is measured parallel to a longitudinal axis between the ends of the cyclone."

88. The Hoover Fusion has this element. This element requires that the distance between the cone opening and the base surface be measured parallel to the longitudinal axis between the ends of the inner cyclone. The distance between the cone opening at the bottom of the inner cyclone and the base surface of the container of the Hoover Fusion discussed in paragraph 83, above, was measured parallel to the longitudinal axis between the ends of the inner cyclone.

Claim No. 7 of the '038 Patent

89. Claim no. 7 of the '038 Patent has the following element:

> "Apparatus as claimed in any one of claims 3, 4, 5 or 6, wherein the base surface has a diameter which is spaced around a longitudinal axis of the cyclone."

90. The Hoover Fusion has this element. This element requires that the Hoover Fusion have the apparatus claimed in any of claim nos. 3, 4, 5 or 6 of the '038 Patent and that the base surface below the inner cyclone have a diameter which is spaced around a longitudinal axis of the inner cyclone. As discussed in paragraph 88, the Hoover Fusion has the apparatus claimed in claim no. 3. The longitudinal axis of the inner cyclone passes through approximately the center of the base surface. Thus, the diameter of the base surface is spaced around the longitudinal axis of the inner cyclone.

A diagram illustrating the relative position of the longitudinal axis of the inner cyclone and the diameter of the base surface is attached as Exhibit 28.

Claim No. 13 of the '038 Patent

91. Claim no. 13 of the '038 Patent has the following elements:

> "Apparatus as claimed in any one of claims 3, 4, 5 or 6, wherein the base surface has a diameter spaced around the longitudinal axis of the cyclone with an upwardly extending annular wall from the base surface wherein a diameter of the wall is greater at an end adjacent the base surface than at an end remote therefrom."

92. The Hoover Fusion has these elements. These elements require that the Hoover Fusion have the apparatus claimed in any of claim nos. 3, 4, 5 or 6 of the '038 Patent and that (a) the base surface below the inner cyclone have a diameter spaced around the longitudinal axis of the inner cyclone with an upwardly extending annular, or ring-shaped, wall from the base surface and (b) the diameter of the annular wall be greater at the end adjacent the base surface than at the end remote from the base surface. As discussed in paragraph 88, the Hoover Fusion has the apparatus claimed in claim no. 3. As discussed in paragraph 90, it also has a diameter spaced around the longitudinal axis of the inner cyclone. The base surface below the inner cyclone of the Hoover Fusion also has an upwardly extending annular wall from the base surface. Using Mitutoyo calipers to measure these diameters, I have determined that the diameter of the annular wall at the end adjacent the base surface is greater than the diameter of the annular wall at the end remote from the base surface. A diagram illustrating the location, shape and relevant diameters of the upwardly extending annular wall is attached as Exhibit 29.

Claim No. 14 of the '038 Patent

93. Claim no. 14 of the '038 Patent has the following elements:

"Apparatus as claimed in any one of claims 3, 4, 5 or 6, wherein the base surface is spaced around the longitudinal axis of the cyclone with an upwardly extending annular wall from the base surface wherein the end of the wall remote from the base surface is radiused."

94. The Hoover Fusion has these elements. These elements require that the Hoover Fusion have the apparatus claimed in any of claim nos. 3, 4, 5 or 6 of the '038 Patent and that (a) the base surface below the inner cyclone be spaced around the longitudinal axis of the inner cyclone with an upwardly extending annular, or ring-shaped, wall from the base surface and (b) the end of the annular wall remote from the base surface be radiused. As discussed in paragraph 88, the Hoover Fusion has the apparatus claimed in claim no. 3. The longitudinal axis of the inner cyclone passes through the middle of the base surface of the dirt collection chamber and, thus, the base surface is spaced around the longitudinal axis of the inner cyclone. The base surface also has a ring-shaped, *i.e.*, annular, wall extending upwardly from the base surface. The annular wall also is radiused, or rounded, at its top, *i.e.*, at the end of the wall remote from the base surface. The rounded nature of the top of the annular wall is illustrated in the diagram attached hereto as Exhibit 29.

Conclusions

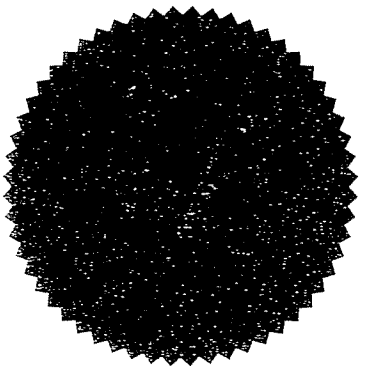
95. For the reasons set out above, I have concluded that the Hoover Fusion infringes the specified claims of the four Patents in Suit.

Gareth Evan Lyn Jones

Sworn to before me this
25th day of July, 2005

Notary Public

Monmouthshire
Wales
U.K.



APOSTILLE
(Hague Convention of 5 October 1961 / Convention de La Haye du 5 octobre 1961)

UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND

1. Country: United Kingdom of Great Britain and Northern Ireland
Pays: Royaume-Uni de Grande-Bretagne et d'Irlande du Nord

This public document / Le présent acte public

2. Has been signed by / a été signé par: **A J Gill**

3. Acting in the capacity of / agissant en qualité de: **Notary Public**

4. Bears the seal/stamp of / est revêtu du sceau/timbre de: **The Said Notary Public**

Certified/Attesté

5. at London/à Londres

6. the/le **25 July 2005**

7. by Her Majesty's Principal Secretary of State for Foreign and Commonwealth Affairs / par le Secrétaire d'Etat Principal de Sa Majesté aux Affaires Etrangères et du Commonwealth.

8. Number/sous No **G763582**

9. Stamp: / timbre:

10. Signature: **K. Khan**

FOREIGN AND COMMONWEALTH OFFICE LONDON

For the Secretary of State / Pour le Secrétaire d'Etat

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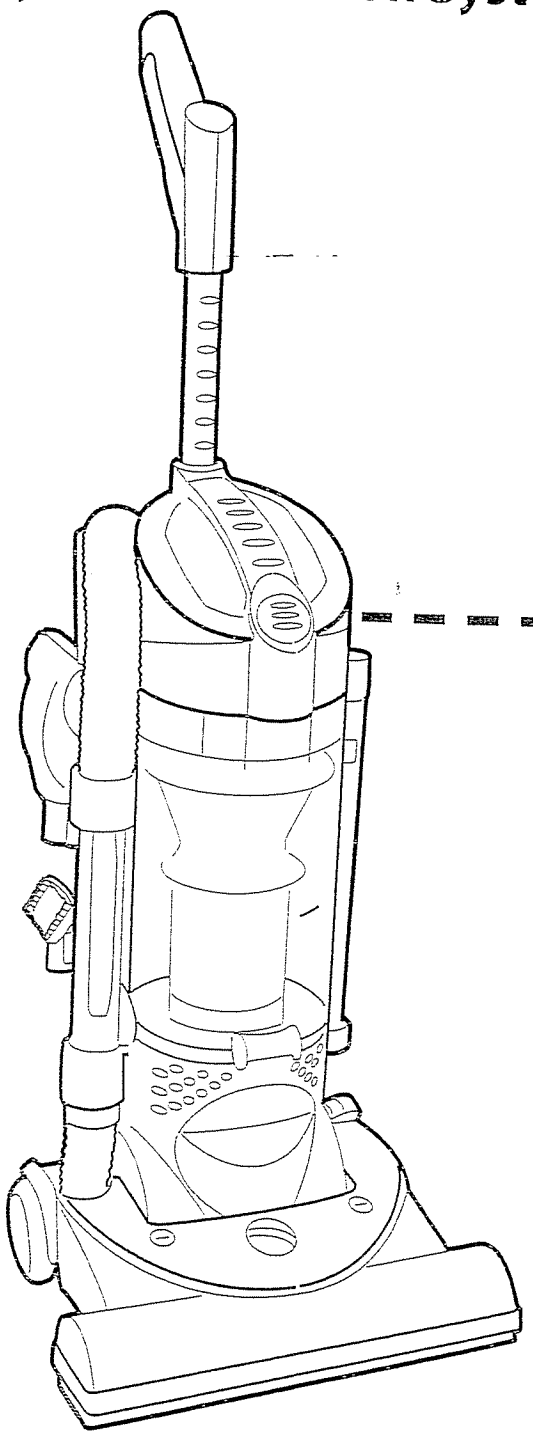
Exhibit 1 – Copy of Hoover Fusion Owner's Manual

HOOVER®

FUSION™

Cyclonic Filtration System



Owner's Manual

ENGLISH → pp. 1-12

ESPAÑOL → pág 13-19

FRANÇAIS → p. 20-26

This product was designed for easy assembly (see page 3)

Review this manual before operating the cleaner.

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A123